

SUMMARIZED MINUTES

of the

NINETEENTH VALLEY-STATES CORRELATING CONFERENCE

Hotel Andrew Johnson, Knoxville, Tennessee

Tuesday, October 6, 1942

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The 19th Valley-States Correlating Conference was called to order at 9:00 a.m., by Chairman Cooper. Later in the forenoon, Dean Schaub of North Carolina was asked to take the chair for a time.

O. PERSONNEL OF THE CONFERENCE

A list of those in attendance from the various agencies is given below. Director Davis and Dean Funchess of Alabama, Director Brown of Georgia, Dean Jacob of Tennessee, and Director Hutcheson of Virginia, were unable to be present; but two of them sent representatives in their stead. Of the four affiliated States, only Arkansas was represented.

<u>Alabama</u>	None present
<u>Arkansas</u>	Dean W. R. Horlacher, College of Agriculture, Fayetteville
<u>Florida</u>	None present
<u>Georgia</u>	Director H. P. Stuckey, Experiment Station, Experiment Mr. E. D. Alexander, Extension Agronomist, representing Director Brown, Extension Service, Athens
<u>Kentucky</u>	Dean Thos. P. Cooper, College of Agriculture, Lexington
<u>Louisiana</u>	None present
<u>Mississippi</u>	Director L. I. Jones, Extension Service, State College Director Clarence Dorman, Experiment Station, State College
<u>No. Carolina</u>	Dean I. O. Schaub, College of Agriculture, Raleigh Director L. D. Baver, Experiment Station, Raleigh
<u>So. Carolina</u>	None present
<u>Tennessee</u>	Director C. E. Brehm, Extension Service, Knoxville Director C. A. Mooers, Experiment Station, Knoxville Asst. Director J. H. McLeod, Extension Service, Knoxville Mr. H. E. Hendricks, Agron. Specialist, Ext. Serv., Knoxville President J. D. Hoskins, University of Tennessee, Knoxville (By invitation)



Virginia Dr. T. B. Hutcheson, Agronomist, representing Director  
J. R. Hutcheson, Extension Service, Blacksburg  
Director A. W. Drinkard, Jr., Experiment Station, Blacksburg

Tennessee Valley Authority, Knoxville

Director J. C. McAmis, Dept. of Agricultural Relations  
Mr. Neil Bass, Chief Conservation Engineer  
Asst. Director L. C. Salter, Dept. of Agricultural Relations  
Mr. H. A. Powers, Chief, Test-Demonstrations, Agric. Relations  
Chairman D. E. Lilienthal, Board of Directors (on invitation)

U. S. Department of Agriculture, Washington

Mr. J. L. Boatman, Chief, Division of Subject Matter, Extension  
Service, representing Director M. L. Wilson  
Dr. J. T. Jardine, Chief, Office of Experiment Stations  
Dr. Carleton R. Ball, Executive Secretary, Correlating Committee

1. STATUS OF VALLEY-STATES MEMORANDUM OF UNDERSTANDING

On April 25, 1942, the Secretary of Agriculture wrote to Dean Cooper, Chairman of the Valley-States Correlating Committee, concerning the Valley-States Memorandum of Understanding and stating that:

"I am hereby giving notification that the Department intends that it be terminated on June 30, 1942. If it is desired, we shall, of course, be glad for Departmental representatives to work with representatives of the agricultural colleges concerned and the Tennessee Valley Authority in developing a new memorandum in the light of current and prospective situations."

The matter was referred to President J. D. Hoskins, of the University of Tennessee, President of the Association of Land-Grant Colleges and Universities. He called a conference of the Presidents of the seven Valley-States Land-Grant Colleges. This group created a committee to confer with Secretary of Agriculture Wickard. The committee was composed of President Hoskins of the University of Tennessee, President Graham of the University of North Carolina, and Director H. A. Morgan of the Authority. The committee was unable to arrange an early conference with Secretary Wickard.

Following the suggestion in the letter of Secretary Wickard, the signatory institutions were asked to designate representatives on a committee to work out a revised memorandum of understanding. The Valley-States institutions designated Dean Cooper of the Kentucky College of Agriculture and Chairman of the Valley-States Correlating Committee. The Tennessee Valley Authority named Mr. Neil Bass, Chief Conservation Engineer, under whose charge are the Departments of Agricultural Relations, Chemical Engineering, and Forestry Relations. The U. S. Department of Agriculture designated Mr. J. L. Boatman, Chief of the Division of Subject Matter, Extension Service, and representative of Director Wilson at recent Valley-States conferences.



This revision committee met at Knoxville, Tennessee, on August 28, and Dean Cooper was chosen as chairman. Certain revisions in the memorandum of understanding were agreed upon unanimously at this meeting. The revised memorandum was entrusted to Mr. Boatman for rewriting in duplicate and transmission to Secretary Wickard for approval, signature, and transmission to President Hoskins for submission to the other signatory institutions. In the meantime, the Secretary had extended the period of the Department's adherence to the previous memorandum successively to August 31 and October 16, the latter being the effective date of the revised memorandum, when signed.

When this topic was reached in the Conference Program, Chairman Cooper announced that the revised memorandum had been signed by all the contracting institutions and soon would be duplicated and distributed. President Hoskins of the University of Tennessee, who was present by invitation, reported that after the Secretary of Agriculture had sent him the newly signed memorandum he had transmitted it promptly to the Presidents of the Valley-States institutions, who had signed it in record time. He stated that it then had been signed by the Chairman of the TVA Board of Directors and that he took pleasure in presenting it to the conference as a completed instrument, to be distributed to each signatory institution. He felt it to be a good example of what can be accomplished by cooperation and a proof that all necessary adjustments can be made by conference of the parties concerned. A copy of the revised memorandum of understanding is attached as Appendix A (p. 15).

## 2. PROCEDURES IN PROGRAMS AND RELATIONSHIPS IN ORGANIZED SOIL CONSERVATION DISTRICTS

In response to a query as to whether previously-established procedures or new procedures were to be followed in cooperating with organized soil conservation districts within the Tennessee Valley, the Chairman asked the Secretary to read the revised memorandum of understanding, exclusive of the introductory "Whereas" clauses, which was done. Later, the Chairman read these introductory clauses, which recite facts concerning the establishment, resources, and activities of the Valley-States institutions, their cooperative relations with the U. S. Department of Agriculture, and the desirability of full cooperation with the Tennessee Valley Authority in the development of the Valley area.

Director Brehm stated that the Tennessee Extension Service had kept the Soil Conservation Service out of the Valley counties under the impression that the TVA did not want them in, and that President Hoskins' conference was the first intimation to the contrary. He asked what had been the understanding and what was the present status.

Dean Cooper and Director McAmis said that there had been no attempt to block action but that naturally it had been desired that any new cooperation be initiated through the Correlating Committee. It was pointed out also that this matter had been discussed at several previous meetings but that Alabama had not always been represented.



Chairman Cooper then asked the Secretary to read Paragraphs (2) and (3) under "Cooperation with other Federal Agencies" in the Report of the Secretary's Committee on relationships and procedures of the Soil Conservation Service (pp. 25-26), submitted on June 5, 1936, as well as paragraphs (2) and (3) under "Procedures" in the Valley-States Memorandum of Understanding (p. 3, revised edition). Copies of these extracts from the two documents then were distributed to the conference members by the Secretary. A copy is attached as Appendix B (p. 19).

Mr. Boatman pointed out that cooperation depends primarily on persons rather than on memorandums. The facts recited in the amendment to the Valley-States memorandum were well understood but the situation in Alabama was brought before the Department by a Member of Congress through direct inquiry as to whether the Federal law requiring aid to requesting State soil conservation districts was being obeyed. It became necessary, therefore, to insert the specific language of the new amendment.

Director Brehm stated that soil conservation districts had been kept out of the Valley counties of Tennessee by the TVA and the Extension Service and asked what he now should say to his farmers, in view of the requirements of the State laws authorizing soil conservation districts. Should he tell them that he would submit their proposals to the Correlating Committee?

Director McAmis pointed out that there is a difference between the Soil Conservation Service and the soil conservation districts operating under State laws. Dean Schaub stated that the Soil Conservation Service, working in soil conservation districts, may recommend practices not approved by the State College or the TVA.

Mr. Boatman and Director Bayer stated that, while soil conservation districts are organized under State laws, the State Advisory Committee, consisting of the Directors of the State Extension Service and Experiment Station and the State Coordinator of the Soil Conservation Service, is responsible for deciding on the procedures and programs in such districts.

Chairman Cooper stated that either the Soil Conservation Service or the State institution could bring in a proposal for cooperative activity. Director Bayer remarked that two committee conferences had covered these problems but that the State Advisory Committee in Alabama had not determined and reported approved procedures for cooperation in the State. (Discussion of this topic was dropped at this point but was resumed in the afternoon session, as recorded in the following paragraphs. - Sec'y.).

Chairman Cooper, on resumption of discussion of program topics 12 and 13, stated that formerly the question of participation in soil conservation activities had been talked over with the individual farmer and he had made the decision. Now, with organized districts, it will be better to ask the district supervisors to leave the test-demonstration farms out of their program of operations. Dr. Hutcheson and Mr. Alexander agreed that there had been no difficulties in operating in districts outside the Valley area. Dr. Bayer stated that the State Advisory Committee has responsibility for decisions where several agencies are involved.



Mr. Boatman suggested that, as the SCS may change some farm procedures, it will be best if they do not operate on already established test-demonstration farms. In the case of test-demonstration farms established hereafter, it will be better to develop the joint program in districts on a satisfactory test-demonstration basis.

Mr. McAmis stated that there is no conflict between the formation of soil conservation districts under State laws and the regional program in the Tennessee Valley area. The TVA has not questioned the formation of such districts, as it is assumed that they are empowered to operate independently of any party to the memorandum, but should any party signatory to the memorandum propose assistance to soil conservation districts, such assistance should conform to the memorandum.

The TVA has endorsed the consensus of the Valley States conference that the USDA and the TVA could and should cooperate with such districts in conformity with the memorandum of understanding, which provides that educational programs in soil conservation in the Tennessee Valley area be conducted by and through the Land-Grant Colleges.

When the Department informed the Correlating Committee of its intention to approve the applications of the northeast and northwest Alabama soil conservation districts, the question raised by the committee was not with regard to the legal establishment of these districts under State law but whether the manner in which the Department, through the Soil Conservation Service, proposed to render assistance to the districts was in accord with the memorandum of understanding. This is the question that the committee had undertaken to resolve when the Department served notice of its intention to cancel the memorandum.

Mr. McAmis further stressed the importance of a coordinated effort in the development and use of all the resources in the Tennessee Valley region. He reviewed the original understanding of the regional program and expressed the hope that the principles and policies then adopted could be given a fair trial with the hearty support of all parties to the memorandum as revised.

Mr. Boatman, agreeing with the latter statements, said that the Secretary of Agriculture appoints the State Advisory Committee and that operations begin only after they have approved a program. The districts represent a locally-organized body and the Soil Conservation Service is a separate organization.

Mr. Boatman further remarked that the TVA had not objected to the operations of the AAA, the FCA, or the FSA, where the representatives work directly with the farmers.

Director Bayer saw no reason why the TVA and SCS programs should not go along together. He reported that Dr. H. H. Bennett had stated definitely that the State Soil Conservation Advisory Committee has the



responsibility of developing the program of soil conservation work within the State. He further expressed the belief that the Correlating Committee should devise suitable procedures for work in the soil conservation districts.

MOVED by Director Bayer that the Correlating Committee work out suitable procedures for cooperation with the SCS in soil conservation districts within the Tennessee Valley area and make them available for the information of the State Advisory Committees. Seconded by Director Dorman.

Director McAmis expressed doubt that the Correlating Committee should attempt to develop procedures. It was

MOVED that the Correlating Committee hold a conference with Dr. H. H. Bennett on the problems involved. Seconded and CARRIED.

### 3. REPORT OF THE AGRONOMY-ANIMAL INDUSTRY COMMITTEE

At the 18th Valley-States conference on March 3, 1942, it was voted (Minutes, p. 12) that a meeting of agronomy, animal industry (animal husbandry and dairying), and forestry workers be arranged, in the interest of a coordinated Valley-States land-use program. Director L. D. Bayer of North Carolina previously had been made chairman of a committee for this purpose, with authority to select the two additional members of his committee. (Minutes 17th Valley-States conference, October 28, 1941, pp. 9 and 11):

It was decided to be preferable to correlate the farm crop and livestock programs effectively before attempting to integrate farm forestry therewith. Accordingly, Chairman Bayer selected, as the other members of the committee, Dr. Norman J. Volk, Head of the Department of Agronomy in the Alabama Experiment Station, and Dr. W. P. Garrigus, Chairman of the animal industry group in the Kentucky College of Agriculture.

On call of this committee, a 2-day conference of agronomists and animal industry workers from the seven Valley-States was held at Atlanta, Georgia, on May 27-28, 1942. After full discussion of problems and programs, reports were submitted by the agronomy and animal industry subcommittees and by the conference committee named above. These reports then were further discussed and amended.

These reports from the May conference were presented by Chairman Bayer and are reproduced in full in these minutes as Appendix C (p. 21). At the close, he stated that the May conference had recommended the creation of a standing committee of three men (one agronomist, one animal industry representative, and a Station Director as Chairman, all elected for 3-year terms) to correlate the agronomic and animal industry research in the Valley. He reported that, in order to stagger the terms, the May conference had elected Dr. Volk as the agronomic member for one year and Dr. Garrigus as the animal industry member for two years.



MOVED by Dr. Bayer that the committee report, and the conference recommendation of a standing committee, be adopted and that their action in electing two members of said standing committee be ratified.

MOVED by Dr. Dorman that the motion be amended by providing also that Director Bayer be elected the Experiment Station member and Chairman of the standing committee for a 3-year term. The motion as amended was seconded and CARRIED.

#### 4. WAR RELATIONS OF THE TVA

Chairman David E. Lilienthal, of the Board of Directors of the Tennessee Valley Authority, was invited to address the conference on a subject of his own choosing. The topic selected, as given above, was most timely. As the subject was covered to a considerable extent on pages 4-8 of an address given later in the same day to an assembly of TVA workers at the Douglas Dam, copies of this address have been obtained and are attached hereto as Appendix D (p. 35).

#### 5. ADDRESS ON "PARITY", BY J. F. PORTER, TENNESSEE

Early in the forenoon session, Director McAmis had extended an invitation to the conference members to attend the weekly luncheon meeting of the Knoxville Rotary Club and hear an address on parity, by President J. F. Porter of the Tennessee Farm Bureau Federation.

It was MOVED by Director Drinkard that this invitation be accepted and the motion was seconded and CARRIED unanimously. The conference adjourned at 12:00 noon, with agreement to reconvene at 1:45 p.m.

In beginning his address, President Porter announced that he would not attempt a lengthy discussion of parity in itself but only in its historical and economic setting. He then gave a clear and often humorous review of American farming during and since World War I. Therein he defined parity as fairness, showed its place in the agricultural picture, and described some of the problems met in attempting to achieve it.

#### 6. SOCIOLOGICAL STUDY OF COOPERATIVE ADMINISTRATIVE RELATIONSHIPS

On reconvening after luncheon, Chairman Cooper presented a letter from Mr. Philip Selznick to Director McAmis, under date of October 3rd. The writer stated that he had come from the Department of Sociology of the Graduate School at Columbia University, under appointment as a Fellow of the Social Science Research Council, to make a study of the cooperative relations between the TVA, the Valley-States Land-Grant Colleges, and the U. S. Dept. of Agriculture. The major emphases were described as follows:



- "1. An intensive study of the consequences, for organizational policy and behavior, of the attempt by a Federal agency to aid in the attainment of regional objectives by working with and through the established institutions of the area.
2. A study of the attempts being made, as a part of the cooperative program, to involve local groups, at the county and community levels, in the administration of the program."

Mr. Selznick stated further that he was endeavoring to look beyond the formal administrative activities to the actual problems which arise in operating the regional program. The study, therefore, essentially becomes a case history of organizational behavior as it is shaped by the responses of its participants to the needs and problems of a living program. From these viewpoints, he asked permission to examine relevant records of the cooperating institutions, as a supplement to personal contacts.

On suggestion of Chairman Cooper, it was agreed, without formal action, that it would be proper to permit access to pertinent records not held to be of a confidential nature between the State Colleges and TVA.

7. STRONG AND WEAK POINTS IN COOPERATIVE PROCEDURES TO DATE,  
WITH A VIEW TO CONTINUED IMPROVEMENT

Director McAmis: It is generally agreed that most of the points in the procedures of the cooperative program may be classed as strong. However, there are some weak points.

The program is too much departmentalized in the institutions, and not enough institutionalized. There is a tendency to keep different lines of activity quite separate in most States.

Director Bréhm: You and others talked for a week about objectives but it was all talk. No written set of objectives or procedures has yet been produced, after all these years. It is desirable to define relationships all the way down the line, from subject-matter specialists to supervisors, to county agents, to assistant agents.

Director McAmis: There are too many projects and too many project adjustments. Ultimately, some projects should be completed. All projects should be under one master contract, as, for example, those in forestry, rural electrification, etc. All projects should be overhauled regularly. The Authority would like to have the institutions give consideration to the feasibility of a contract providing for reimbursement on the kind and amount of work to be done and upon results accomplished.



Director Brehm: Personnel has been severely cut and the Extension Service is lucky to keep one man in each county and he must help to carry the program of all agencies. In the meantime, the USDA sends out a War Board memorandum advising the purchase of northwestern seeds by southeastern farmers, whereas Extension urges southeastern farmers to grow their own seeds.

Dean Cooper: Institutional programs are ideal, but difficult to attain. TVA should think longer about that type of proposal. It is difficult of operation and requires very expert supervision.

Dr. Drinkard: TVA has all the records and should be able to show any State where any weakness in its program lies.

Dr. Jardine: Audit and Controller agencies continually question how the value of services may be judged, especially those of part-time employees.

#### 8. REDIRECTION OF TEST-DEMONSTRATION REQUIREMENTS

The following discussion was based on the latter part of Topic 6 in the conference program, reading as follows: "Increased Numbers of Limited-Record Test-Demonstration Farms and Intensified Records on a Small Number." The following paragraph summarizes the conclusions.

Some complete records from test-demonstration farms are necessary. Mortality among test-demonstration farms is high and the legal goals, while good, are difficult of attainment. Records must be digested and interpreted to be of any use. With reduced personnel, and increasing wartime needs and pressures, it will be better to attempt fewer complete records and really get them than to continue striving for a very large number and not get any of them fully. The test-demonstration farms should be used to supply data but through research technics on a relatively small number of units.

Director McAmis: The TVA was invited to join, and has joined, in the work of a post-war planning committee. It should operate through this conference and not in artificial regions. Preferably, it will represent a joint contribution of all agencies. The study of the French Broad River caused the engineers to change their plans for dams.

Director Bayer: A southeastern regional committee has been appointed. Mr. McArdle says that State representatives will be appointed soon. Perhaps a definite coordination of effort is needed.

Mr. Salter: At the recent regional meeting in Atlanta, it was stated that Directors of Extension would be invited to serve on the State committees.



## 9. CONTRIBUTIONS OF THE TEST-DEMONSTRATION PROGRAM TO THE WAR EFFORT

In Georgia, a rise in the soil-fertility level occurred in the Tennessee Valley area, carrying capacity was increased on limed and phosphated pastures, and residual effects produced increased yields of grain.

In Kentucky, farmers had been made so appreciative of the value of phosphates that they were greatly disconcerted when a lack of phosphates developed.

In Mississippi, the program has encouraged soil building, especially in nitrogen through legume crops.

In North Carolina, gains of beef cattle were high on fertilized pastures and very small on the unfertilized checks. The area of dairying was increased by the program.

In Virginia, the place of the program in a long-time program for agriculture was widely discussed in meetings and served to hold all types of Extension work together. It is recognized as the best method of Extension teaching and it was an almost providential preparation for this war emergency.

In all States there was greatly increased use of lime.

(A considerable discussion of this question will be found in the various State reports on results, as published in "Part 2: Extension Service Test-Demonstration Results." Sec'y.).

## 10. REPLACING PERSONNEL AND REVISING BUDGETS

Institutional programs have been disarranged. Fewer teachers but also fewer pupils. Two classes of men have been lost, namely, key men taken for special and technical work and young men taken as volunteers or inductees. Leave has been granted to the older men but the Act requires reinstatement of service men in as nearly as possible the same grade or position. Must keep as many key men as possible, get along with fewer high-grade men, and use more inexperienced men and women. The administrative responsibility of the best men can be broadened.

Inexperienced workers can be used in laboratory under supervision but not in the field. Field men must be trained in some line although not necessarily in the line for which they now are to be used. In North Carolina, four women have been employed as assistant county agents in the test-demonstration program. One already has developed a demand for phosphate larger than that in other counties.



Research must be redirected to war ends. It is better to obtain adequate appropriations, where possible, even if some money must be turned back, than to lack funds for important work when it is demanded. Less experienced workers probably will cost less per person. On the other hand, wages have increased from 10 to 100 percent or more. Where wages have doubled, it more than offsets any financial gain from hiring less experienced workers.

#### 11. PROPOSED BULK SHIPMENTS OF PHOSPHATES

Director McAmis stated that bulk shipments would cut the costs for bags and handling at the plant. It was recognized that it would increase the labor and difficulty at the receiving end. He felt it desirable to study the possibility of bulk shipments in a few selected counties. There was some discussion, and a statement that there might be heavy loss from farm wagons on mountain roads, but no action was taken.

#### 12. APPROVAL OF PHOSPHATES ON A LAND-USE BASIS

Restrictions on phosphate use to date have been based primarily on kind and acreage of crop. Director Jones stated that in Mississippi no phosphate is approved for application to land on which erosion cannot be controlled. The general sentiment seemed to be that each State should determine this procedure for itself.

#### 13. PHOSPHATE DISTRIBUTION BY TVA IN 1943

Mr. Bass stated that the War Department had not used the amount of elemental phosphorus so far in 1942 which had been scheduled and, as a result, the excess had been converted into triple superphosphate. The Authority, therefore, expects to be able to supply the phosphate needed in 1943 for the test-demonstration program. The British situation, however, is changing. They are producing much more food at home and have stated that they need 540,000 tons of triple superphosphate per year for this purpose. This requested tonnage is much greater than this country's total production in 1942. Britain asks this country to divert its total production of concentrated phosphatic fertilizers to the British Isles. This request is being considered by the combined Food Board. Phosphate now is under WPB control.

#### 14. INCORPORATION OF TVA NITROGEN PRODUCTS IN THE COOPERATIVE PROGRAM

Director McAmis stated that the Authority is manufacturing nitrogen substances for war purposes. If available, these could be used as fertilizer materials. It is likely that chemical nitrogen will be available from the fertilizer plants in the near future and it seems desirable to have preliminary tests of nitrogen products as early as possible. Various forms of nitrogen could be made available to the State Experiment Stations and research work might soon be done on the particular forms thought to offer the greatest promise.



The general opinion seemed to be that research should be undertaken on the forms that could be produced and delivered to the land at the lowest cost. That which proved cheapest in concentrated form would be the best. Virginia desired a basic or neutral rather than an acid form. Research is needed on the possibility of application by spraying.

#### 15. IN-SERVICE TRAINING FOR ASSISTANT COUNTY AGENTS

The question raised was whether TVA should continue to assemble groups of assistant county agents for special training. Three groups had been so assembled during the current year, two groups for a period of one week each and one group for three weeks.

The general sentiment seemed to be reluctance to let these men go away from their home areas while operating pressures on all employees are so high. The impression left was that no more groups would be called together in the immediate future.

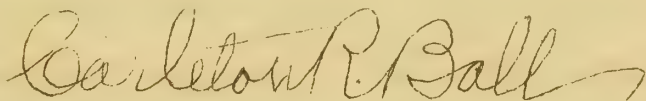
#### 16. PLACE AND DATE OF NEXT CONFERENCE

There was discussion of the inaccessibility of Knoxville to workers in Alabama, which probably had kept both directors away from the present conference. Other States pointed out their difficulties. The secretary showed that, of 18 meetings recorded, 7 had been held in Knoxville, 4 in Chattanooga, 3 in Alabama (Birmingham, Florence, and the Shoals), 2 in Georgia (Atlanta), 1 in North Carolina (Asheville), and 1 in Virginia (Roanoke). A list of the places and dates of the previous semiannual conferences follows.

MOVED by Director Jones that the next conference be held at the Piedmont Hotel, Atlanta, Georgia, on Tuesday, April 6. Seconded and CARRIED.

On motion, the conference adjourned.

Respectfully submitted,



Carleton R. Ball  
Secretary



VALLEY STATES CONFERENCES:

of

LAND-GRANT COLLEGE DEANS AND DIRECTORS,

TENNESSEE VALLEY AUTHORITY OFFICIALS, and

U. S. DEPARTMENT OF AGRICULTURE REPRESENTATIVES

<u>No.</u>	<u>Date</u>	<u>Place</u>	<u>Minutes</u>
1.	1933,	(?)	None
2.	1933, October 7	Knoxville, Tennessee.	Typed, 1 p. Funchess letter, 1 p.
3.	1934, July 6-7	Chattanooga, Tennessee.	Typed, 5 pp.
4.	1934, October 27	Muscle Shoals, Alabama.	Mimeographed, 13 pp.
5.	1935, December 12	Chattanooga, Tennessee.	Typed, 15 pp.
6.	1936, June 26-27	Chattanooga, Tennessee.	Mimeographed, 20 pp.
7.	1937, February 6	Knoxville, Tennessee.	Typed, 5 pp.
8.	1937, July 10	Knoxville, Tennessee.	Typed, 10 pp.
9.	1937, November 3	Knoxville, Tennessee.	Typed, 5 pp.
10.	1938, April 25	Knoxville, Tennessee.	Typed, 12 pp.
11.	1938, October 4	Atlanta, Georgia.	Typed, 10 pp.
12.	1939, April 4	Birmingham, Alabama.	Typed, 9 pp.
13.	1939, October 2	Chattanooga, Tennessee.	Typed, 9 pp.
14.	1940, April 2	Knoxville, Tennessee.	Mimeographed, 18 pp.
15.	1940, October 1	Asheville, North Carolina.	Typed, 9 pp.
16.	1941, March 4-5	Florence, Alabama.	Mimeographed, 32 pp.
17.	1941, October 28	Atlanta, Georgia.	Mimeographed, 29 pp.
18.	1942, March 3	Roanoke, Virginia.	Mimeographed, 22 pp.
19.	1942, October 6	Knoxville, Tennessee.	Mimeographed,



Appendix A

STATEMENT  
AND  
MEMORANDUM OF UNDERSTANDING

Between  
THE UNITED STATES DEPARTMENT OF AGRICULTURE,  
THE TENNESSEE VALLEY AUTHORITY,  
AND  
THE AGRICULTURAL COLLEGES OF THE STATES OF  
ALABAMA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA,  
TENNESSEE, and VIRGINIA,

Relative to

Systematic Procedure for a Coordinated Program of Agricultural Research,  
Extension, and Land-use Planning Within the Region of the  
Tennessee Valley Authority

STATEMENT OF INTENTIONS

- (1) WHEREAS, the Tennessee Valley Act contemplates and authorizes the development of a long-time program, including the conduct of projects essential thereto, for the readjustment and rehabilitation of rural areas on a sound economic and social basis for the permanent welfare of the people of the region included in the Act; the methods and results of such activities to serve as a guide in the long-time program throughout the Nation; and
- (2) WHEREAS, the Federal Congress and the State Legislatures have established, in each of the States materially affected by the Tennessee Valley Act, institutions designated to carry on teaching, research, and extension activities for the betterment of agriculture and rural people, and the Federal Congress has established agencies within the United States Department of Agriculture to participate in the administration of such research and extension activities, and
- (3) WHEREAS, the State institutions, working with the United States Department of Agriculture in their respective States, under authority granted by the State legislatures and the Federal Congress, have developed comprehensive training, research, and extension projects basic to the welfare of the people of the respective States; have established valuable facilities and equipment, and a trained personnel which has effective working relationships with the people of their commonwealths; and have accumulated a fund of scientific facts and experience, indispensable in a program for the orderly development of the agriculture and rural welfare of the region, and
- (4) WHEREAS, the Tennessee Valley Act, in order to effect a proper development of agriculture and land use in the territory related to or materially affected by this Act, specifically provides for cooperative arrangements between the Authority and national, State, and local public agencies and authorizes the Authority to request the cooperation of the United States Department of Agriculture and the Agricultural Colleges, and



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- (5) **WHEREAS**, The cooperative arrangements between the United States Department of Agriculture and designated State institutions referred to above offer a workable basis for projecting a regional program consequent to the purposes of the Act, and offer an opportunity to coordinate those phases of the research, extension, and educational activities of these agencies related to a unified regional program, thus resulting in the maximum of efficiency and economy;
- (6) **THEREFORE**, For the purpose of providing a systematic procedure for carrying out agricultural research and extension for their respective States, and to secure the coordination of a regional program throughout the Tennessee Valley area, the State institutions, the United States Department of Agriculture, and the Tennessee Valley Authority consider it desirable to enter into a memorandum of understanding in accordance with the basis of understanding which has existed for many years between the United States Department of Agriculture and the State institutions for the conduct of research and extension projects.

#### MEMORANDUM OF UNDERSTANDING

**LEGAL AUTHORITY:** Congressional appropriations to the United States Department of Agriculture, to the Tennessee Valley Authority, and to the States for agricultural experiment station and extension work, and State appropriations for such work.

**OBJECT:** To coordinate those phases of the research, extension, land-use planning, and educational activities of these agencies which are related to a unified, regional agricultural program.

**ORGANIZATION:** The State Agricultural Colleges involved in the cooperation will designate a State contact officer to be selected jointly by the Director of the Experiment Station and the Director of Extension, and financed jointly by the Agricultural Experiment Station and Extension Service, or by those agencies and the Department of Agriculture and/or the Tennessee Valley Authority. The duty of the contact officer is to familiarize himself with the work of the Tennessee Valley Authority affecting the agriculture of the region and with that of the Department of Agriculture, and to make this information available to the Experiment Station and Extension staffs in his State. It will be advisable for the Agricultural Experiment Station and Extension Service in each State to set up joint committees from their staffs to give consideration to special projects such as erosion control, land utilization, rural credit, land settlement, and rural electrification.



To further the initial development of such a coordinated program, and until superseded by other methods, it is proposed that cooperation under this memorandum be initiated through a Correlating Committee of three, as provided by the paragraphs under Procedure. The Correlating Committee shall consist of three members: one representing the State Agricultural Colleges, one representing the Department of Agriculture, and one representing the Tennessee Valley Authority. The representative of each institution or group on this Committee may be changed at any time by action of the respective group or agency which he represents. The Committee may, when such employment seems desirable, employ an Executive Secretary to be financed by any of the agencies involved, or by two or more of them jointly.

**PROCEDURE:** To promote coordinated effort in meeting problems of the region under consideration, any procedure formulated to bring about joint effort must be flexible enough to allow for initiative and adjustment on the part of one State or all States and of all parties to this memorandum of understanding. The following procedure is outlined to serve as a guide rather than as a complete formula.

(1) The State contact officer, to be selected by the Director of the Experiment Station and the Director of Extension in the respective State, and the station and extension staff, will decide upon adjustments of the State program to best coordinate with the program of the Tennessee Valley Authority, and the U. S. Department of Agriculture.

(2) Proposals for a joint coordinated activity on the part of two or more States, the Department of Agriculture, and/or the Tennessee Valley Authority may be submitted by one or more States to the representative of the State Agricultural Colleges on the Correlating Committee. In like manner, agencies of the Department of Agriculture or of the Tennessee Valley Authority may submit proposals for joint coordinated activities to the Correlating Committee through their respective representative on this Committee, or the Correlating Committee may initiate proposals for joint coordinated activities.

(3) Proposals for joint coordinated activities which the Correlating Committee consider of sufficient merit to warrant formulation of a project involving two or more agencies will be submitted to all parties to this memorandum of understanding with suggestions and recommendations.

(4) It is understood that neither this memorandum of understanding nor the Correlating Committee provided for herein, has administrative jurisdiction which would prevent any signatory agency or institution from carrying out the provisions of legislation for which said signatory is responsible. (New language, Aug. 28, 1942).



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**FINANCING:** Where practicable, the salary and travel expense of the State contact officer will be financed jointly by the State Agricultural Experiment Station and Extension Service with funds at the disposal of the respective Directors of these agencies, but the cooperation of the Department and/or the Tennessee Valley Authority may be enlisted where desirable and necessary. Joint research or extension projects may be financed jointly by two or more of the agencies concerned under supplementary memorandums of understanding covering specific projects.

**DURATION AND WITHDRAWALS:** The duration of this memorandum of understanding shall be extended for successive fiscal years unless notice of termination shall be given in writing by a signatory institution at least 30 days before the end of any fiscal year (Revision of April 15, 1936).

**DATE EFFECTIVE:** This second revision of the memorandum is to be effective on October 16, 1942.

U. S. DEPARTMENT OF AGRICULTURE

By Claude T. Wickard  
September 4, 1942. Secretary

ALABAMA POLYTECHNIC INSTITUTE

By L. N. Duncan  
President

TENNESSEE VALLEY AUTHORITY

By David S. Silenthal  
Chairman

UNIVERSITY OF GEORGIA

By Thomas W. Lawrence  
President

UNIVERSITY OF KENTUCKY

By H. F. Donovan  
President

MISSISSIPPI STATE COLLEGE

By G. D. Humphrey  
President

UNIVERSITY OF NORTH CAROLINA

By Frank P. Graham  
President

UNIVERSITY OF TENNESSEE

By James S. Hoskins  
President

VIRGINIA POLYTECHNIC INSTITUTE

By Julian D. Burnett  
President



## SPECIFIC PROCEDURES FOR COOPERATION WITHIN THE TENNESSEE VALLEY

Procedures to be followed in initiating and maintaining cooperative projects by two or more Federal or State agencies, within the Tennessee River watershed, were set forth officially in 1934 and again in 1936.

In 1934, they were embodied in the Tennessee Valley Memorandum of Understanding between the U.S. Department of Agriculture, the Land-Grant Colleges of the seven Valley States, and the Tennessee Valley Authority. In 1936, they were written into the report submitted on June 6 by the Committee on functions, relationships, and procedures of the Soil Conservation Service, appointed by the Secretary of Agriculture. For the information of Conference members, the two statements are presented below.

From the Tennessee Valley Memorandum of Understanding (p. 6).

"(2) Proposals for a joint coordinated activity on the part of two or more States, the Department of Agriculture, and/or the Tennessee Valley Authority may be submitted by one or more States to the representative of the State stations on the Correlating Committee. In like manner, agencies of the Department of Agriculture or of the Tennessee Valley Authority may submit proposals for joint coordinated activities to the Correlating Committee through their respective representatives on this Committee, or the Correlating Committee may initiate proposals for joint coordinated activities.

"(3) Proposals for joint coordinated activities which the Correlating Committee consider of merit such as to warrant formulation of a project involving two or more agencies will be submitted to all parties to this memorandum of understanding with suggestions and recommendations."







~~Final Report of the Tennessee Valley Authority to the Soil Conservation Service, 1931~~

"(2) That the Soil Conservation Service not undertake erosion-control work in the area under the jurisdiction of the Tennessee Valley Authority except as agreed upon by the existing T.V.A. coordinating committee of three representing the Department, the Tennessee Valley Authority, and the seven States in the Tennessee River Basin. This T.V.A. committee has been established to provide coordination of all agricultural activities conducted within that area.

"(3) That the Soil Conservation Service be authorized to propose cooperative action in erosion control to other Federal agencies; that the Soil Conservation Service make the preliminary surveys and prepare the plans for erosion control, and, if desired, supervise the agreed-upon activities, subject to the sharing of expense by the two cooperating agencies as might be mutually agreed upon by the heads of the Federal departments or independent agencies involved."







REPORT OF THE AGRONOMY-ANIMAL INDUSTRY CONFERENCE

AT ATLANTA, GEORGIA, ON MAY 27-28, 1942

As a result of the Roanoke meeting of the Valley-States Conference, I was appointed as Chairman of a Committee, to be selected by me, for the purpose of organizing a coordinated program of research in Agronomy and Animal Industry. Dr. Norman J. Volk, Head of Agronomy at the Alabama Station, and Dr. W. P. Garrigus, Head of Animal Industry at the Kentucky Station, were selected as the other two men on the Committee. A conference was called in Atlanta, Georgia, for May 27-28, 1942. Lists of those in attendance, and of the subjects discussed, are given below.

List of Those Attending Agronomy-Animal Industry Conference

Committee Members:

Dr. L. D. Baver, Director, North Carolina Agricultural Experiment Station (Chairman)  
Dr. W. P. Garrigus, Chairman, Animal-Industry Group, Kentucky College of Agriculture  
Dr. N. J. Volk, Head of Agronomy Department, Alabama Agricultural Experiment Station

State Representatives:

J. T. Williamson, Agronomy, Alabama Experiment Station  
W. E. Sewell, Animal Husbandry, Alabama Experiment Station  
R. P. Bledsoe, Agronomy, Georgia Experiment Station  
Z. A. Massey, Animal Husbandry, Georgia Experiment Station  
P. E. Karraker, Agronomy, Kentucky Experiment Station  
J. L. Anthony, Agronomy, Mississippi State College  
A. E. Cullison, Animal Husbandry, Mississippi Experiment Station  
W. W. Woodhouse, Agronomy, North Carolina Experiment Station  
A. O. Shaw, Animal Industry, North Carolina State College  
R. W. Shoffner, Farm Management, North Carolina Extension Service  
J. B. Washko, Agronomy, Tennessee Experiment Station  
T. B. Hutcheson, Agronomy, Virginia Polytechnic Institute  
H. E. Hunt, Animal Husbandry, Virginia Experiment Station

TVA and Other Representatives:

G. M. Rommel, Preliminary Investigations, Department Agricultural Relations, TVA  
E. O. Fippin, Preliminary Investigations, Department Agricultural Relations, TVA  
Carleton R. Ball, Executive Secretary, Correlating Committee



### List of Subjects Discussed

#### Valley-States Research Projects with TVA Materials

- Relative efficiency of different phosphates.
- Influence of phosphate on composition and nutritive value of herbage.
- Residual effects of phosphate.
- Availability of phosphate as influenced by fineness of grinding and fluorine content.
- Report of Agronomy Subcommittee on methods used in conducting greenhouse experiments with phosphates.
- Phosphates and limiting factors in crop production and livestock feeding.
- Report of Animal-Industry Subcommittee.
- Explanation and adoption of Animal-Industry report.

#### Discussion of Questions Submitted by States and Other Agencies

#### Report of the Agronomy-Animal Industry Committee

### VALLEY-STATES RESEARCH PROJECTS ON TVA MATERIALS

A mimeographed tabulation of State station projects, as taken from the State reports in "Part 1: Agricultural Experiment Station Results," was distributed. Each of the State programs was reviewed and consideration was given to new projects and procedures which seemed desirable.

The mimeographed list covered 20 general station projects. Comments by the different States indicated that some of them were engaged on more of the 20 projects than they had reported on in Part 1, or were listed in the mimeographed summary. A completed list of these projects is appended to this report (p. 11).

### Relative Efficiency of Different Phosphates

The four major types of projects on efficiency of the different phosphatic materials furnished by TVA were (1) in field rotations, (2) on different field crops, (3) on yield, vegetative composition, and chemical composition of pastures, and (4) on availability in greenhouse experiments.

The general consensus of opinion was that sufficient work had been done on the different phosphates with the exception of the newer materials such as calcium metaphosphate, calcium-potassium metaphosphate, and fused rock phosphate, but that more work was needed on the chemical composition of pasture herbage. It was pointed out by several States that well-established studies of returns from rates of application of triple superphosphate were under way and would be continued. A summary of results of the comparisons of various phosphates is appended (p. 13).



Influence of Phosphates on Composition  
and Nutritive Value of Herbage

There was considerable discussion of the effect of different phosphates on the yield, vegetative composition, and chemical composition of pastures, and of the question of the effect of phosphate fertilizer applied to pastures on beef and dairy production, and on nutritive quality of the herbage.

It was pointed out that the matter of determining chemical composition of herbage is not a simple one. Pastures contain many species of legumes, of pasture grasses, of weedy grasses, and of other weeds. The relative vegetative composition varies considerably in the different parts of the Valley area. It varies with the age of the pasture and with the treatment given to the pasture. Professor Hunt pointed out that pasture management is as important as fertility in determining the character of the vegetation and the chemical composition.

Georgia reported that the chemical composition of grasses and legumes was determined separately. The survival of different species in the mixtures is different and the proportion varies also with the advance of the season. Virginia reported separate chemical analyses for legumes, for pasture grasses, and for a third group consisting of broomsedge and other weeds.

On the question of the effect of different phosphates on the chemical analyses of resulting plants, North Carolina cited the differences between fused rock phosphate which produced a high calcium content, calcium metaphosphate which produced a high phosphorus content, and triple superphosphate which was intermediate between these two. Karraker of Kentucky noted data obtained under greenhouse conditions and felt that chemical data were not significant unless correlated with the rate of phosphate application. A low phosphate level in the experiment resulted in a low phosphate content of the crop.

There followed a considerable discussion of the carotene content of herbage, Dr. Garrigus asking if it was a limiting factor in feeding value. Shaw of North Carolina stated that a 90% increase in carotene content had been obtained and Hunt and Hutcheson of Virginia noted that increase in carotene content of feeding stuffs produces yellow fat and may cause a market discrimination against meat from animals so fed. Woodhouse of North Carolina noted that there had been an increase in carotene content after the first season but was not certain whether from bluegrass or legumes.

Sewell of Alabama reported that dairy cattle respond to the carotene content of pasture, including winter grazing crops. Hutcheson of Virginia stated that dairymen put material in silos in order to obtain yellow milk. Dr. Washko of Tennessee reported an Oregon experiment wherein increased

carotene content influenced the hatchability of eggs and several members noted an increase in the use of yellow corn as compared with white for feeding livestock and poultry. Shaw of North Carolina noted that cattle are not as well fed in winter as they should be and that a storage of summer carotene supplies for winter use would be highly desirable.

Dr. Bayer, in summarizing the discussion, noted the importance of the chemical composition of animal feeds and especially of the mineral content. He emphasized the difference in the quality of the different species composing pastures and meadows and urged determination of vegetative composition. He recognized that it was physically impossible to analyze all the numerous species found in different pastures, but urged chemical analyses of the different important species separately rather than merely as grasses and legumes.

#### Residual Effect of Phosphates

In a brief discussion of the residual effects in rotations and the effect, on succeeding crops, of phosphate applied to annual summer and winter legumes, it was pointed out that as the rotations progressed much more information would become available on these points.

#### Availability of Phosphate as Influenced by Fineness of Grinding and Fluorine Content

This was a joint discussion of phosphate availability in greenhouse experiments, and the effect of particle size and fluorine content on availability of fused rock phosphate.

Bayer questioned the value of field experiments on fineness of grinding and felt it better to make preliminary studies in the greenhouse, eliminating some intermediate sizes. Hutcheson of Virginia felt that it would be better to start both greenhouse and field experiments at the same time as otherwise time would be lost in getting both sets of results. He stated that a soil may show an element deficiency in the greenhouse but would not show it in the field. Karraker stated that the reverse also was true but that he did not wish to discuss field experiments as Professor Roberts was responsible for them in Kentucky whereas he was charged with greenhouse experiments. Dr. Volk stated that the reaction on different soil types might be entirely different and Dr. Washko suggested that the stage of maturity at which the plant was analyzed would influence the results.

Professor Hutcheson raised the question as to whether pots should be fertilized on the basis of field treatment per unit of soil or on the basis of the number of plants per pot as related to the average number of plants per acre. It was his feeling that response was better for application per plant than per amount of soil. Professor Karraker felt that the application should be on the basis of soil quantity.



Mr. Rommel of TVA suggested that, in the long series of experiments on fused rock phosphate, the product had not been entirely uniform, including fluorine content. The Authority is trying to perfect the process but wishes to know what is the accepted crop tolerance for fluorine as, for instance, between 0.1 and 0.5 per cent.

Baver, pointing out that it was not necessary for each State to conduct these experiments in order to get results applicable in the Valley area, suggested appointment of a subcommittee on procedures in this problem. This subcommittee consisted of Williamson of Alabama, Bledsoe of Georgia, Karraker of Kentucky, Anthony of Mississippi, Woodhouse of North Carolina, Washko of Tennessee (Chairman), and Hutcheson of Virginia. The report of this subcommittee was as follows:

Report of Agronomic Subcommittee on Methods  
Used in Conducting Greenhouse Experiments with Phosphates

As various methods for conducting greenhouse experiments with phosphates are in use at present in the six States cooperating with the TVA in this work, an attempt was made by representatives of these States to standardize their methods. The subcommittee makes the following suggestions.

1. Application. That different rates of application be used on a graduated scale varying from 40 pounds per acre total  $P_2O_5$  to 120 pounds per acre. As an example, the following might be used: 40, 80, and 120 pounds per acre. Variations could be made within this range to suit the needs of the cooperator.

Applications would be made on the basis of soil weight, using 2 million pounds of soil per acre as the standard.

The other essential nutrient elements necessary for plant growth would be added at the discretion of the cooperator but in such a manner that the limiting factor in growth would be phosphorus.

2. Crop. The crop species found most suitable to the conditions of the cooperator would be used. The crop grown in common by the various States once a year would be sudan grass.

3. Time of harvest. The various crops would be harvested when the plants have ceased growth. In the case of sudan grass and wheat this would be at the time of heading. In the legumes this would be at the stage when ready for turning under.

4. Replication. At least three replications would be used but this would be governed by facilities at the disposal of the cooperator.

The report of the subcommittee was unanimously adopted.

Phosphates and Limiting Factors in Crop Production  
and Livestock Feeding

This discussion began on the basis of the residual effects of phosphates on crop production, but later included other phases of the problem. The recommendations of the previous agronomic committee were read and it was suggested that there had not been enough studies of soil characteristics to permit interpolating data obtained from one soil type in results obtained from another type.

The inter-relations of phosphorus and other elements were pointed out from different viewpoints by several speakers. Under many conditions there is no response to phosphate unless potash is supplied. On the other hand, a high phosphate level may stimulate depletion of potash or some other element until it becomes a limiting factor. This may be true of such minor elements as boron. A survey of the Coastal Plain area in North Carolina showed a deficiency of cobalt and also a deficiency of vitamins. More results may be governed by management practices than by soil types. The use of sulphur in nitrate may change results by changing the pH. Much larger proportionate quantities of nutrients may be taken out of a fertile soil than from an infertile soil.

All these facts are related to the time, rate, and method of application of phosphates. For example, it is known that, when used together, both manure and organic phosphates go deeper in the soil. It was pointed out also that sufficient nitrogen is necessary in order that phosphorus and potash be used effectively. Mr. Rommel pointed out that one cannot separate the conditions existing in crops, animals, and human beings. He cited the Tennessee experiments with rats and calves on low-phosphorus and high-phosphorus hay. Professor Shaw suggested that vitamins may have been the limiting factor. Dr. Garrigus suggested possible correlation between phosphorus in plants and in the blood of animals. Professor Bledsoe referred to the complications of using the data on calf crops. Professor Cullison of Mississippi referred to their experiments with cows on fertilized pasture, on native pasture with supplemental mineral feeding, and on native pasture alone.

Professor Shaw of North Carolina stated that most stockmen already are feeding mineral supplements and questioned whether one important effect of phosphorus in forage might not be to increase its palatability.

A subcommittee of five Animal-Industry representatives was appointed to consider the problems associated with animal industry and to bring back suggestions for a research program. The committee consisted of Sewell of Alabama, Massey of Georgia, Cullison of Mississippi, Shaw of North Carolina, and Hunt of Virginia (Chairman). The subcommittee asked Mr. Rommel of TVA to meet with them. The subcommittee report is given below and is followed by certain explanatory notes.



### Report of the Animal-Industry Subcommittee

The methods of procedure should be those of the American Dairy Science Association and the American Society of Animal Production.

The needs of livestock research are and should be:

1. Greater feed production per acre.
2. Greater efficiency of feed produced.
3. Improved quality of food produced for human consumption.

Types of projects needed and work that the livestock units should do:

1. Projects to study the best level of livestock nutrition during winter. (See explanation below)
  - a. Silage.
  - b. Winter crops.
  - c. Better hay management.
  - d. Cow-calf plan.
2. Projects to measure the efficiency of pasture utilization during the grazing season. (See explanation below)
  - a. Study of lignification.
  - b. Palatability.
  - c. Management.
  - d. Animal variation.
  - e. Clipping in relation to change in nutritive value.
3. Projects to study the value of supplemental pastures. (See explanation below)
4. Projects to study the mineral deficiencies affecting livestock in the Valley and means to correct them. (See explanation below)
  - a. Determine if there are mineral deficiencies.
  - b. Use of mineral mixtures while pastures and forages are being produced.
5. Projects to study farm unit problems. (Should be a farm operated by and controlled by the Experiment Station. Study should include all problems of a typical farm and interpretation in terms of the total farm enterprise.)
  - a. Better utilization of existing research data.
  - b. Animal rotation, involving parasite control.

### Explanation and Adoption of Animal-Industry Report

1. Methods of accomplishing better livestock nutrition in winter include: Use of surplus May-June pasture growth as silage, more hay crops in proportion to pasture, extension of the pasture-grazing period, calf disposal in fall, more winter crops, etc.

2. Measuring the efficiency of pasture utilization during the grazing season. This is equivalent to effective pasture management. It must be remembered that check plots also improve during good pasture management, and sometimes even more than the treated plots. Professor Cullison asked regarding the feeding-out of cattle on the pastures in order to keep the manure there. Varied opinion resulted. Trampling soft ground in early spring is harmful to turf and to white-clover nodules. Professor Hutcheson felt it better to stack hay and fodder in the pasture, but under a roof to reduce spoilage, and to use a movable feedrack so that feeding can be done on galled or poor spots. Manure aids white clover. It also contains weed seeds. The seeds of most pasture weeds, however, already are in the soil and manure merely enables the weeds to make good growth.

3. Studying the value of supplemental pastures. Professor Hutcheson stated that supplemental areas should be reserved to be used as pasture in dry summers or as hay for winter carry-over. Western and eastern animals differ in grazing habits and preferences, assimilation of feeds, health, etc. Relation between animals and pasture must be kept in mind. Gains may be greater, in proportion to removal of plant and mineral materials, on poor pasture than on good. Best management of bluegrass pasture requires supplemental pasture to relieve summer pressures, especially in dry periods.

It was pointed out that many long-held theories in regard to soils, plants, animals, feeds, foods, and consumer preferences and prejudices have been disproved in recent years.

4. Mineral deficiencies and means to correct them. A survey of the problem is needed. The United States Soil, Plant, and Nutrition Research Laboratory at Cornell University is determining the content of different minerals in various plants. The Committee feels that a study of mineral needs is required, that it fits into the national nutrition program, and that a priority war rating could be obtained. Survey should determine the specific problems of different districts and work then should be done on them.

Weather conditions or stage of maturity may influence mineral content as much as kind or variety of plant. There also is a difference in the problem of animal nutrition, which is economic, and that of human nutrition, which is social welfare. The animal tissues withdraw minerals from the bones, if necessary. Any studies made must include the complete cycle from soil to plant, from plant to animal and animal product, and from product to the human being.

This report was unanimously adopted.

#### DISCUSSION OF QUESTIONS SUBMITTED BY STATES, ETC.

A mimeographed list of 24 questions submitted by the States, the Committee, and TVA, for discussion, was presented. This list is appended (p. 34). Several of these questions were discussed and, in such cases, the list number is inserted at the beginning of the paragraph below.



1. Desirability of uniform experiments in the several States. (Committee, North Carolina, and Virginia). Without doubt, the techniques should be uniform.

2. Should phosphate be tested on the basis of total or available  $P_2O_5$ ? (Virginia). Professor Hutcheson felt that probably it should be applied on the basis of available  $P_2O_5$ , where situated far from the source of supply. In their older experiments, raw-rock and fused-rock phosphates were applied on the basis of total phosphoric acid and the other phosphates on the basis of the available quantity. Their newer experiments are all on the basis of total quantity.

6. Need of supplements, such as sulphur, etc., in high-analysis phosphates (Committee). Small amounts of sulphur are needed in fertilizers except in the Birmingham district where rains bring down 35 lbs. per acre annually from the smoky atmosphere. The average deposit by rain outside the Birmingham district is only 6 lbs. Sulphur can be supplied with N, K, or Ca compounds. Bayer felt that enough work had been done on sulphur, provided the soil type under consideration is known, and that using sulphur on sandy soils might be a good insurance. Others felt that it cost less to add gypsum than to test all soils for sulphur needs.

7. Cropping systems vs. individual crops in field tests with phosphates (Kentucky, Committee). Professor Karraker pointed out that availability differs with crops and that, in a rotation, crops can be used with reference to availability. Bayer suggested that, whereas we had been testing phosphates at the beginning, we now are testing cropping systems. Both agreed that where fertilizer is applied to cotton and tobacco, other crops in the rotation use the residual quantities.

9. Effect of phosphorus and lime on production of legume seed (Mississippi). Professor Anthony stated that seed production in legumes is increased 20 to 30 percent when they are phosphated. Mr. Williamson said that without phosphate no vetch could be grown and hence no vetch seed produced. Mr. Shoffner reported that little lespedeza seed was produced on checks but good production occurred on phosphated areas. It was stated by representatives from North Carolina and Virginia that boron is required on red clover and lespedeza in those States.

Professor Hunt pointed out that legumes will not pay for sowing unless they get sufficient quantities of phosphorus and potash to permit real growth. Winter legumes are very susceptible to weather conditions. This is especially true of small-seeded varieties, the roots of which may fail to reach moisture.

23. Results from Ca and K metaphosphate. Dr. Washko stated that in Tennessee tobacco took up about 20% more potash from potassium metaphosphate than from other potash sources.

## REPORT OF THE AGRONOMY-ANIMAL INDUSTRY COMMITTEE

As a result of questions brought up in the different discussions, the Joint Committee of Agronomists and Animal Industry workers, provided for at the 18th Valley-States conference, reported through Chairman Bayer with recommendations as follows:

1. Composition of pasture flora.
  - a. Composite the results from different phosphate sources.
  - b. Enlargement of work should be in the form of species separation.
    - 1) Legumes.
    - 2) Desirable grasses.
    - 3) Undesirable grasses and weeds.Each State to make any further breakdowns that it sees fit.
2. In all rates of application and similar phosphate studies, all other nutrients which might be limiting factors should be applied in adequate amounts or incorporated in the experiment so as to have these variables under control.
3. Fundamental soil studies should be inaugurated on residual effects of phosphate, rates of phosphate application, and methods of incorporation, to provide information on the reasons for results obtained on different soil types. This will make possible a wider use of obtained data.
4. Standing Committee. A standing committee should be set up by this group of technical men for the purpose of coordinating the agricultural research in the Valley. The responsibility of this committee will be to review proposed new projects involving TVA research and suggest appropriate interstate committees for organizing details.

This Committee report was adopted with the understanding that one Agronomist and one Animal-Industry representative be elected to serve with a Station Director as the proposed standing committee.

It was suggested that, if the committee were to consist of three men, each member should be elected for three years, one member going off in each year. To start with, one member would be elected for one year, one for two years, and one for three years. Future elections would be for three years.

Dr. Volk was elected as the Agronomic member for one year and Dr. Garrigus elected as the Animal-Industry member for two years.

Submitted by the Committee.

L. D. Bayer, North Carolina, Chairman  
N. J. Volk, Alabama, Agronomy  
W. P. Garrigus, Kentucky, Animal-Industry



PROJECTS CONDUCTED COOPERATIVELY IN THE 7 VALLEY STATES

Type of Project	States Participating						
	: Ala. :	Ga. :	Ky. :	Miss. :	N. Car. :	Tenn. :	Va. :
1. Different phosphates in field rotations			Corn-wheat-legume		Corn-wheat (legume). Corn-cotton		Rotations *
2. Different phosphates on different crops in the field	Cotton	Cotton		Cotton corn oats vetch	Hay rye	Corn wheat leg.hay	Alfalfa corn wheat
3. Different phosphates on pastures							
a) yields	X	X	X		X		X
b) flora	X	X	X		X		?
c) chemical composition	P, Ca soil	P, Ca soil	Protein P, Ca		Protein P, Ca Carotene		Protein P, Ca
4. Availability of phosphates in greenhouse experiments			X			X	X
5. Residual effect of phosphates on crop production			Rotations	Cotton	Rotations		Pasture
6. Rates of triple superphosphate application (also metaphos where named)	Cotton	Pastures	Pas- tures	Vetch Pasture	Rotations pasture (meta also)	(Cal- cium meta also)	Pasture
7. Influence of phosphate fertilization of pastures on:							
a) beef cattle production		Calf crop		X		X	X
b) dairy production							X
c) nutrition of herbage						X	
8. Effect of phosphate on different legumes		Soybean sweet cl. Vetch soybean winter pea crotalaria lespedeza	Clover les- pedeza	Vetch les- pedeza	Clover les- pedeza soybean	Clover alfalfa	Alfalfa clover

\*Corn-wheat-clover; tobacco-wheat-clover; corn-peas-cotton; corn-wheat-wheat-clover; corn-potato-alfalfa-alfalfa.



	Ala.	Ga.	Ky.	Miss.	N. Car.	Tenn.	Va.
9. Effect of phosphate, applied to legumes, on succeeding crops		Winterpea sweet clover		Vetch	Lespe-deza		
10. Top-dressing vs. soil incorporation of P on pastures			X	X			
11. Supplements to phosphates							
a) pastures		Minor elements					CaSO <sub>4</sub>
b) cotton	CaSO <sub>4</sub>	CaSO <sub>4</sub> MgSO <sub>4</sub> Cu,Mn,Zn,B		CaSO <sub>4</sub>		CaSO <sub>4</sub>	
c) corn		CaSO <sub>4</sub>		CaSO <sub>4</sub>			
d) peanut		CaSO <sub>4</sub>					
e) rotations							CaSO <sub>4</sub>
12. Study of plant food requirements of crops, using varying quantities of N and K with phosphates							X
13. Fused-rock-phosphate studies	X			Vetch	Pasture corn cotton	X	X
14. Effect of particle size and fluorine content on availability of fused rock phosphate, in greenhouse and field	X	X	X	X		X	X
15. Potassium-metaphosphate studies		Corn peanut cotton		X	Pasture rotations	X	
16. Establishment of pastures on different types of land		X					
17. Kind and rate-of-seeding of pasture mixtures		X					
18. Rates of lime applications on pastures		X					
19. Seed saving from pasture plants		X					
20. Effect of phosphate on black or honey locust trees		Black					Honey



## SUMMARY OF RESULTS FROM DIFFERENT FORMS OF PHOSPHATE

		Phosphorus Carriers					
States:	Crops, Soils and Treatments	20% Super	Dicalcium	Tricalcium	Triple Super	Calc. Meta	Fused Rock
ALA...	Cotton (No P = 100)*	134(140)	134	127	131(139)		
	Clarksville soils	154(170)	155	152	147(164)		
	Decatur soils	124(128)	123	119	121(127)		
	Hartsells soils	135(143)	139	128	133(145)		
	Greenville soils	129(130)	127	123	126(130)		
	Norfolk soils	139(146)	137	130	135(144)		
GA.	Cotton (lbs.)	916(985)	928	866	924(981)		
	Cotton, limed (lbs.)	809	-	-	794	763	769
KY.	Greenhouse (% recovered)	61.9	65.6	52.7	56.9	61.9	61.6
	(wht, lesp, wht, ryegr)						
	Field: Corn (bus.)	30.6	30.1	29.2	30.4		
	Wheat (bus.)	16.8	17.5	16.4	16.7		
	Hay (lbs.)	2813	2729	2801	2759		
	Corn (bus.)	-	-	-	30.9	33.6	30.6
	Wheat (bus.)	-	-	-	12.8	13.1	14.7
	Hay (lbs.)				3021	3214	3318
	Pasture (lbs.)	2917	3046	2974	3087		
MISS.	Cotton (lbs.)						
	Sandy soils	731	718	679	725		
	Heavier soils	1042	1063	1006	1053		
		16-20%					
		Super					
MISS.	Oats (bus.)	26.6	25.3	-	25.4	22.6	-
	Vetch (lbs.)*	5995	6466	5915	6098(6570)	-	-
N.C.	All crops (Series I)	100	103.2	101.4	-	-	-
	All crops (Series II)	100	-	-	88.8		
	With limestone				95.8		
	With gypsum				101.8		
TENN.	All crops (No P = 100)	135	135	-	133	135	129
VA.	Corn (No P = 100)						
	Cecil clay loam	109	120	104	114	110	115
	Dunmore silt loam	115	118	114	117	108	97
	Cecil sandy loam	115	109	109	116	98	60
	Onslow fine sandy l.	124	111	120	116	122	114
	Berks silt loam	113	108	110	112	103	105
	Norfolk sandy loam	114	124	117	127	109	-
	Alfalfa						
	Cecil sandy loam	149	136	138	132	120	-
	Norfolk sandy loam	157	174	161	174	167	-
	All experiments	135	131	125	133	126	120

\*Results in parentheses obtained with phosphate plus dolomitic limestone.



## QUESTIONS SUBMITTED FOR DISCUSSION

1. Desirability of uniform experiments by the several States. (Va., N. C., Committee)
2. Should phosphate be tested on the basis of total or available  $P_2O_5$ ? (Va.)
3. Effect of phosphorus placement on availability of different forms. (Miss., N. C., T.V.A.)
4. Fixation of phosphate. (N. C., T.V.A.)
5. Limitation of phosphate efficiency because of lack of other nutrients, water, placement. (Va., N. C., T.V.A., Committee)
6. Need for supplements, such as sulfur, calcium, and minor elements, to high-analysis phosphates. (Committee)
7. Cropping systems versus individual crops in field tests with phosphates. (Ky., Committee)
8. Advisability of discontinuing treatment in rotation after a period and getting residual effects of applied phosphates. (Ky., Committee)
9. Effect of phosphorus and lime on production of legume seed. (Miss.)
10. Effect of removal of plant nutrients by legumes on the productivity of the soil. (Miss.)
11. Effect of fertilizer on the feed value of forage crops. (Miss., N. C., Va., T.V.A., Committee.)
12. Relation of pasture flora to the response obtained from pasture fertilization. (Miss., Va.)
13. Can phosphate content of mixed forage give a true picture of phosphate intake or should the different species be analyzed? (T.V.A.)
14. Relation of calf crop to phosphorus nutrition. (T.V.A.)
15. Best method of measuring results of fertilization of pastures. (Va.)
16. Time and rate of phosphate fertilization on pastures. (Va., Ky., Committee.)
17. Organic versus inorganic sources of minerals for livestock. (Miss.)
18. Livestock feeding experiments. (Ky.)
19. Pasture-seeding practices in relation to phosphate utilization. (N. C., Committee.)
20. Supplemental dry-weather forage crops. (Va.)
21. Use of test-demonstration farms in obtaining more accurate information concerning local influence of program. (T.V.A., Committee)
22. Why do not increased crop yields result on certain farms? (T.V.A.)
23. Results of tests with Ca- and K-metaphosphates. (Va.)
24. Evaluation of soil-productivity effects of the phosphate program in terms of indexes to supplement present methods. (N. C., Committee)